

FIBER-COUPLED LASER DIODE HAVING HIGH COUPLING-EFFICIENCY AND LOW FEEDBACK-NOISE

Abstract: A laser diode (20) emits astigmatic and elliptical light. The long axis of ellipse is the fast axis of light, and the short axis of ellipse is the slow axis of light. A collimating lens (34) first collimates the slow-axis light. Following the collimating lens (34), a first cylindrical lens (36) focuses the un-collimated fast-axis light. The focused fast-axis light then diverges and reaches a second cylindrical lens (38). The second cylindrical lens (38) collimates the fast-axis light. The collimated slow-axis light is unaffected by both cylindrical lenses. The beam-waist of the fast-axis light is substantially equal to the beam-waist of the slow-axis light by properly designing the focal lengths of both cylindrical lenses. The second cylindrical lens (38) outputs an astigmatic-aberration-free, circular collimated-beam. The corrected beam is then input to a low-feedback-noise fiber collimator (28), resulting in a fiber-coupled laser diode having both high coupling-efficiency and low feedback-noise.